



TECNOMOTOR

APPARECCHIATURE PER DIAGNOSI MOTORI

TECNOMOTOR S.p.A. - Società soggetta a direzione e coordinamento di Nexion S.p.A.
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Service Manual A/C930



Service Manual (ENGLISH)



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1. FIRMWARE AND VEHICLES DATABASE UPDATE PROCEDURE.

1. Take a USB Pen Drive formatted with the FAT32 option. 2. Download the update file and save it into the Pen Drive. 3. The Station must be off. Insert the USB key.	
4. Turn the Station on. The firmware is automatically updated. The CHECK FILE procedure is carried out in the first step.	
5. The FLASH FILE procedure is carried out in the second step.	
6. The program displays the first page of the menu at the end of the Firmware update. 7. Turn the Station off. 8. Remove the USB key.	
9. Turn the Station on to check the Firmware version previously loaded.	
10. Check the current Software version. The program automatically displays the first page of the menu. 11. Insert the Tecnomotor activation code: 34500	



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2. MICROPROCESSOR ELECTRONIC BOARD REPLACEMENT PROCEDURE.

1. Remove the Station front protection.	
2. Disconnect all connectors, without damaging the cables. 3. Release the Electronic Board from the plastic supports (it is recommended to use a 4mm-diameter hose). 4. Replace the Electronic Board with the new one. 5. Put all connectors on.	
6. Turn the AC930 Station on and perform the following operations: a. Refrigerant Cylinder Calibration (see Service Manual). b. New Oil container Bottle (see User Manual). c. Exhausted Oil Bottle Calibration (see User Manual). d. Pressure Sensor Calibration (see User Manual). e. Parameters Setting - SETTING MENU. f. Parameters Setting – MY AC MENU	
7. At the end of the Calibrations the AC930 Station is ready.	



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3. REFRIGERANT CYLINDER EMPTYING PROCEDURE.

1. Remove the Station front protection.	
2. Connect the HP hose, the unions and the outside support cylinder, as shown. 3. Open the high pressure red tap and close the low pressure blue tap of the AC930 Station NOTE: the outside support cylinder must be empty.	
4. Turn the refrigerant cylinder taps, as shown.	
5. Turn the AC930 Station on. 6. Select the Manual Menu. 7. Select the Recovery Cycle and start the cycle.	
8. At the end of the Recovery Cycle, turn the cocks as shown and disconnect the hoses. ATTENTION: the outside support cylinder hose contains a certain quantity of refrigerant! 9. To remove the residual air quantity, open the cock shown by the arrow. 10. At the end, close the cock again.	
11. Turn the AC930 Station off.	



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4. HOSES RELEASE PROCEDURE

The Station must be properly used in the two following situations, to avoid that the Customer inserts more or less refrigerant in the vehicle, compared to the expected nominal value.

1. SETTING WITH HOSES COMPENSATION.

At the end of the automatic cycle the hoses have to be released from the vehicle.
The User has not to crank the vehicle's engine and engage the AC system with the hoses still connected to the vehicle.

WARNING: the AC Station displays the nominal quantity of refrigerant introduced into the vehicle + the nominal quantity of refrigerant contained into the hoses.

2. SETTING WITHOUT HOSES COMPENSATION.

- Carry out the recharge automatic cycle.
- At the end of the recharge automatic cycle, carry out the REFRIGERANT RECOVERY procedure:
 - Release the HP hose from the vehicle.
 - Check that the Station cocks are open.
 - Crank the vehicle's engine and the A/C system. Let all the refrigerant present into the hoses be driven into the vehicle.
 - As soon as the high and low pressure gauges values are equivalent and not higher than 2-3 Bars, disconnect the low pressure hose from the vehicle, without stopping the engine and the AC system.



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5. A/C CIRCUIT PRESSURES CHECK PROCEDURE WITH PIPES COMPENSATION.

This procedure has to be performed at the end of a recharge cycle to check the A/C circuit pressures of the vehicle.

- a. Unplug the Hoses from the vehicle and recover the gas in manual mode.
- b. Close the HP and LP taps.
- c. Plug the Hoses to the vehicle again.
- d. Start the vehicle's engine and the A/C system.
- e. Check the A/C circuit nominal values onto the high and low pressure manometers.
- f. Unplug the HP hoses when engine and AC are running.
- g. Turn the A/C system and the vehicle engine off.

6. A/C CIRCUIT PRESSURES CHECK PROCEDURE WITHOUT PIPES COMPENSATION.

This procedure has to be performed at the end of a recharge cycle to check the A/C circuit pressures of the vehicle.

- a. Close the HP and LP taps.
- b. Start the vehicle's engine and the A/C system.
- c. Check the A/C circuit nominal values onto the high and low pressure manometers.
- d. Unplug the HP hoses when engine and AC are running.
- e. Turn the A/C system and the vehicle engine off.



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7. REFRIGERANT SCALE LOAD CELL REPLACEMENT PROCEDURE.

- The Station must be turned off and disconnected from the vehicle.
- Check the HP and LP gauges. No pressure has to be present into the hoses (if it is not the case, turn the Station on and carry out a RECOVERY procedure of the refrigerant inside the hoses manually)
- Remove the Station front protection.
- Remove the pneumatic hoses connected to the upper side of the refrigerant cylinder.
- Remove the refrigerant cylinder.
- Remove the metal support placed between the load cell and the refrigerant cylinder.
- Remove the load cell, disconnect the connector on the microprocessor board and replace the cell with the new one.
- Insert the USB SERVICE Pen Drive into the Station and turn it on. Wait for the SERVICE program loading into the microprocessor board.
- Set the refrigerant cylinder up.
- Select the CYLINDER SCALE option by means of the keyboard arrows and check the displayed value.
This value must be included between 0-1000.
Otherwise, carry out the following operations:
 - a. If the value is ≥ 2800 insert a resistance of 560 KOhm (between the red and white cables of the load cell connector).
 - b. If the value is $2500 \leq \text{value} \leq 2800$ insert a resistance of 680 KOhm (between the red and white cables of the load cell connector).
 - c. If the value is $1000 \leq \text{value} \leq 2500$ insert a resistance of 1 MOhm (between the red and white cables of the load cell connector).
 - d. If the value is $500 \leq \text{value} \leq 1000$ insert a resistance of 1.5 MOhm (between the red and white cables of the load cell connector).
- Turn the Station off.
- Insert the USB Pen Drive with the last software release and turn the Station on. Wait for the correct program loading.
- Carry out the refrigerant SCALE CALIBRATION procedure.
- At the end of the procedure mentioned above, the Station is ready.



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8. REFRIGERANT BOTTLE SCALE CALIBRATION PROCEDURE.

1. Empty the cylinder from all the refrigerant and execute inside of it a vacuum cycle of at least 15 minutes
2. After accessing the calibration menu SERVICE - ADJUSTEMENT, select "Cylinder scale".
The Password is: 9854
3. Press Enter to set the Zero value
4. Then place the sample weight 6 Kg (max) on the cylinder
5. Enter the weight value with the Up/Down arrows
6. Press the Enter key to measure the weight

7. EXHAUSTED OIL BOTTLE SCALE CALIBRATION PROCEDURE.

1. Empty the exhausted oil container
2. After accessing the calibration menu SERVICE - ADJUSTEMENT, select "Exhausted oil cylinder".
The Password is: 9854
3. Press Enter to set the Zero value
4. Then place the sample weight 200g (max) on the oil container
5. Enter the weight value with the Up/Down arrows
6. Press the Enter key to measure the weight

7. NEW OIL BOTTLE SCALE CALIBRATION PROCEDURE.

1. Empty the new oil container
2. After accessing the calibration menu SERVICE - ADJUSTEMENT, select "New oil cylinder".
The Password is: 9854
3. Press Enter to set the Zero value
4. Then place the sample weight 200g (max) on the oil container
5. Enter the weight value with the Up/Down arrows
6. Press the Enter key to measure the weight

7. PRESSURE SENSOR CALIBRATION PROCEDURE.

1. Make sure that there is no refrigerant inside the system, if there is recover it.
2. Open the HP and LP taps and undo the high pressure connection.
3. Make sure that on the high pressure manometer the indicator is at 0 bar.
4. After accessing the calibration menu SERVICE - ADJUSTEMENT, select "Pressure Sensor".
The Password is: 9854
5. Press Enter to set the Zero value
6. Refit the high pressure connection
7. Connect an empty external bottle to the HO hose and read the nominal pressure on the gauges
8. Enter the pressure value with the Up/Down arrows
9. Press Enter to calibrate the pressure sensor.



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10. VACUUM PUMP.

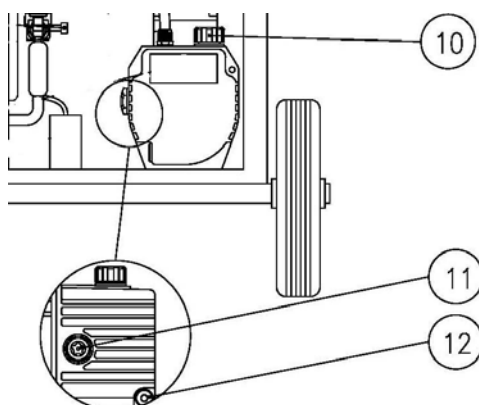
Oil Type: K1L - Oil Viscosity: CSE 68

Every time the "Change pump oil" message is displayed when the equipment starts, it is necessary to change the vacuum pump oil.

All the emptying operations and subsequent recharging should be performed with the pump at stop.

To avoid inhibiting the pump's efficiency and maintaining in time the same performances, use only K1L type oil for the maintenance.

- Before draining the oil, activate the pump for at least 10 minutes with the HIGH and LOW pressure valves closed.
- **Switch off the recovery unit by setting the switch in position 0 and disconnect the mains power supply cable, keeping strictly to the sequence of operations**
- Remove the panel at the rear of the equipment
- Unscrew the drain plug located at the bottom of the pump (ref. 12)
- Drain out the oil totally
- Tighten the drain plug (ref. 12)
- Unscrew the breather plug located at the top of the pump (ref. 10)
- Pour the oil slowly until reaching halfway on the indicator located at the side of the pump
- Tighten the oil plug and refit the panel previously removed
- At the end of the oil change procedure, switch on the equipment
- Select "SERVICE" from the list
- Select "MAINTENANCE" from the list
- Select "OIL PUMP" to reset the counter and inform the machine that the operation has been carried out





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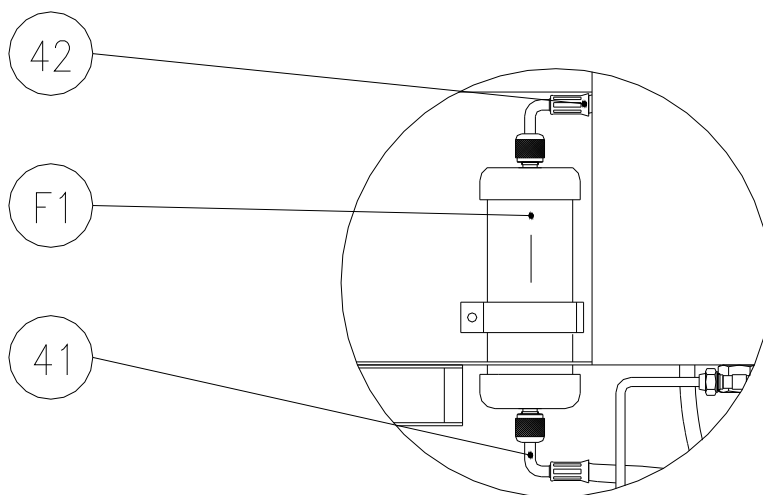


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11. DEHIDRATOR FILTER.

Each time the "Change filter" message is displayed at equipment start-up, the dehydrator filter must be replaced.

- Switch off the recovery unit by setting the switch in position 0 and disconnect the mains power supply cable, keeping strictly to the sequence of operations



- Remove the panel at the rear of the equipment
- Remove the seals inside the flexible pipes (ref. 41 and 42)
- fit new seals
- Fit a new dehydrator filter
- Connect the low pressure connection to the low pressure connector of the compressor
- Open the Low pressure cock
- Supply power to the unit and set the switch to position I
- Execute manually the vacuum function for at least 30 minutes
- At the end of the vacuum operation, close the Low pressure cock and disconnect the compressor's connection
- Refit the panel at the rear of the equipment
- At the end of the filter change procedure, switch on the equipment
- Select "SERVICE" from the list
- Select "MAINTENANCE" from the list
- Select "Filter" from the list and reset the counter



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12. NON-CONDENSABLE DRAINING.

Each time the "Non-condensable check" message is displayed at equipment start-up, it is good practice to check the condition of the non-condensables inside the cylinder

- Select "Non-condensable test" from the service menu
- Enter the cylinder temperature and press OK.
- The screen displays the cylinder pressure and the target pressure value for a correct operation. Through the drain valve located at the machine rear, set the cylinder pressure value to the target value shown on the display.





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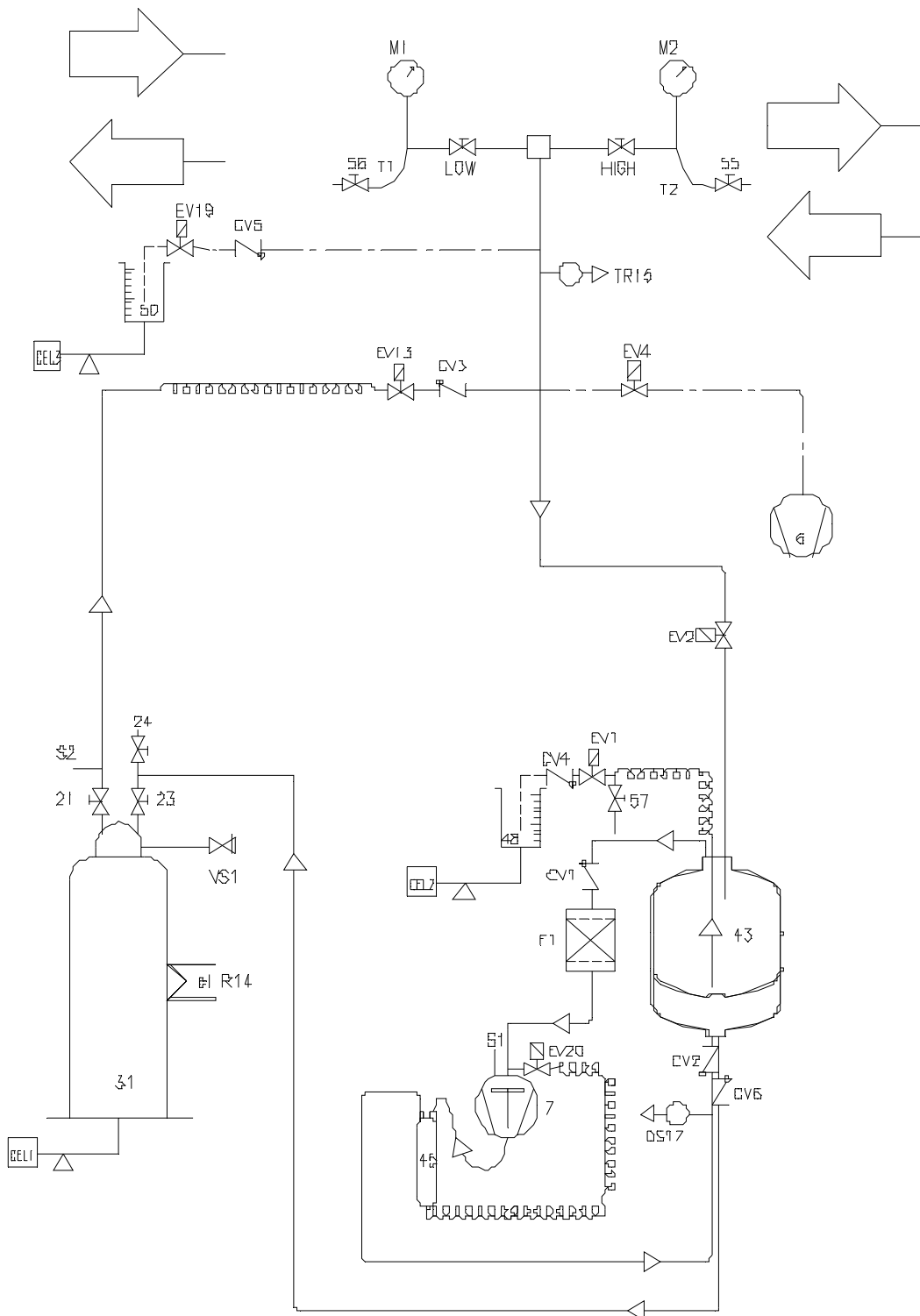
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13. HYDRAULIC DIAGRAMS.



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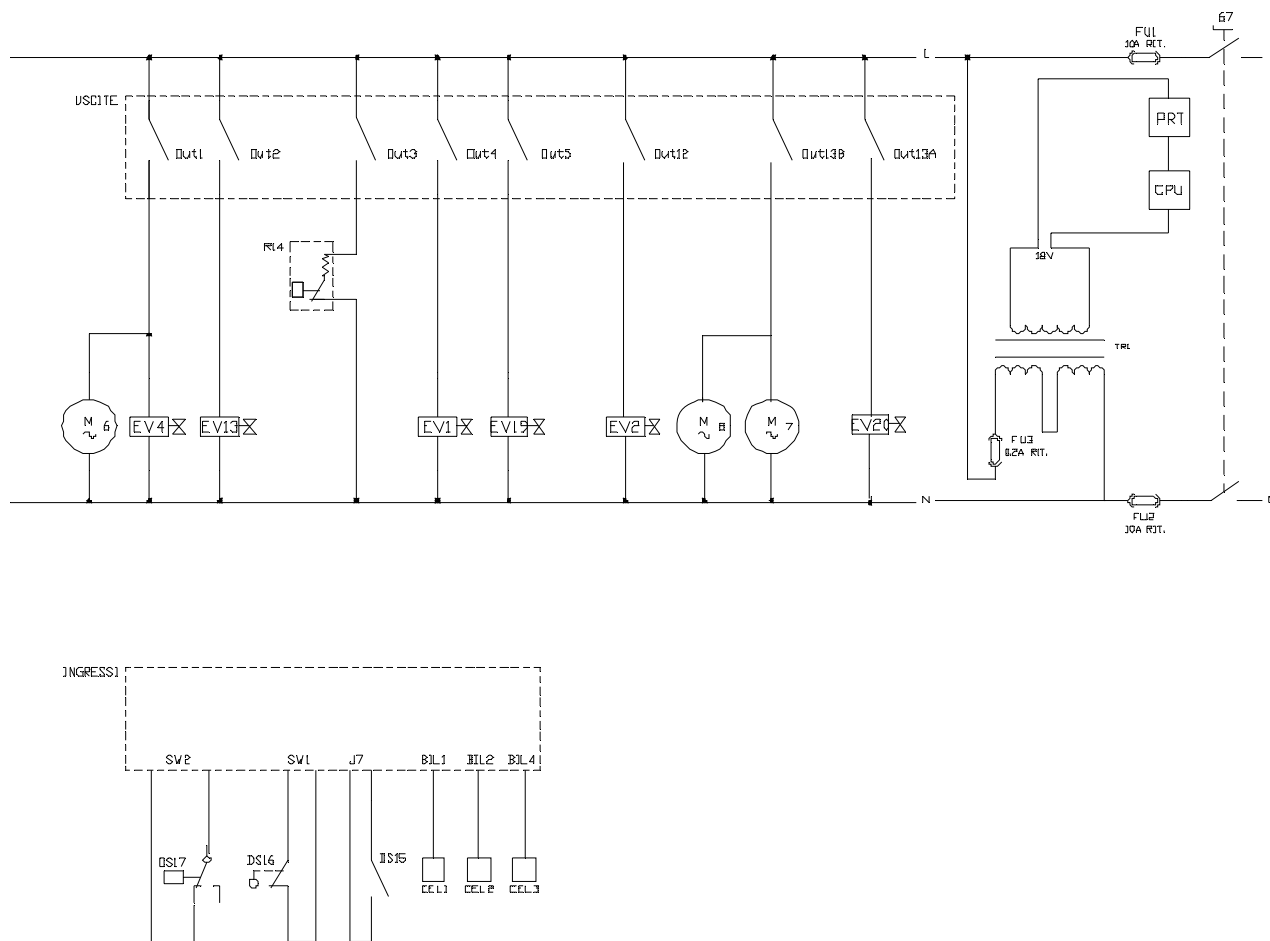
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14.ELECTRIC DIAGRAMS (PWR BOARD).





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15. AC930 STATION LEGEND.

EV1	Solenoid valve on the oil drain line
EV2	Solenoid valve on the recovery line (steam phase)
EV4	Solenoid valve on the vacuum pump intake line
EV13	Solenoid valve on the refrigerant load line
EV20	Solenoid valve on the oil return line to the compressor
EV19	Solenoid valve on the oil load line
6	Vacuum pump
7	Compressor
31	Cylinder
43	Separator distiller
48	Oil drain container
50	Dispenser for oil or additives
R14	Cylinder heater with thermostat
TR15	Pressure transducer
DS16	Separator float
DS17	Security pressure switch
CEL1	Refrigerant scale
CEL2	Oil drain scale
CEL3	Oil load scale
V1	Low pressure hose valve
V2	High pressure hose valve
V6	Cylinder steam valve
V8	Cylinder fluid valve
V10	Manual distiller outlet valve
S1	Service joint for the compressor evacuation
S2	Cylinder fluid joint
T1	Low pressure hose
T2	High pressure hose
CV1	Check valve on the intake line (recovery)
CV2	Check valve on the compressor inlet line
CV3	Check valve on the refrigerant load line
CV4	Check valve on the oil drain line
CV5	Check valve on the oil load line
CV6	Check valve on the compressor outlet line (before the cylinder)
F1	Drier filter
VS1	Cylinder security valve
M1	Low pressure manometer
LOW	Valve on the low pressure line
M2	High pressure manometer
HIGH	Valve on the high pressure line



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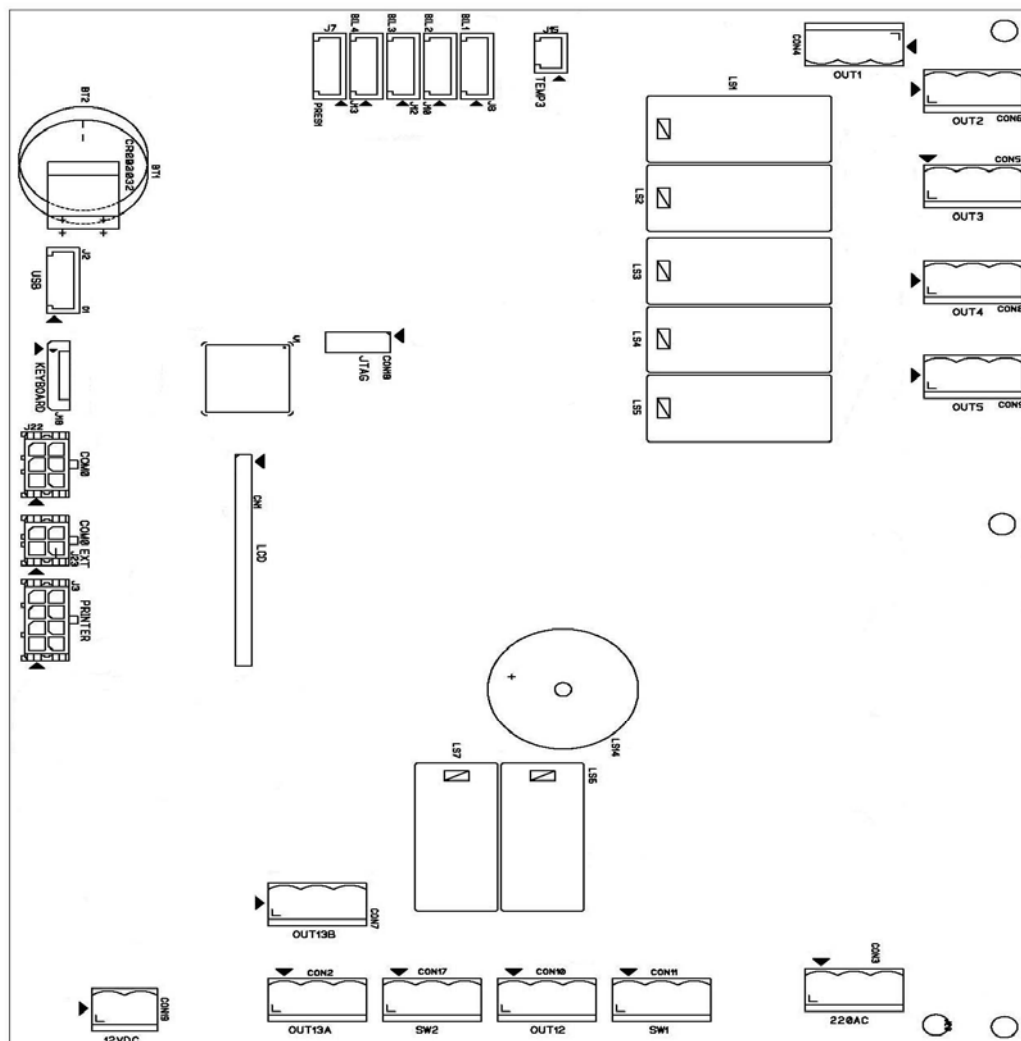
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16. PWR MICROPROCESSOR BOARD LAYOUT.





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17. PWR MICROPROCESSOR BOARD LEGEND.

Connector	Name	Description
BIL1	CEL1	Load cell 100 kg (refrigerant)
BIL2	CEL2	Load cell 5 kg (exhausted oil drain)
BIL4	CEL3	Load cell 5 kg (oil load)
OUT4 – CON8	EV1	Exhausted oil drain line solenoid valve
OUT12 – CON10	EV2	Recovery line solenoid valve
OUT1 – CON4	EV4	Vacuum line solenoid valve
OUT2 – CON6	EV13	Refrigerant load line solenoid valve
OUT5 – CON9	EV19	Oil load line solenoid valve
OUT13A – CON2	EV20	Oil return line to compressor solenoid valve
220VC – CON3	PWR	Board supply - 220V
12VDC – CON19	-	Board supply - 12V
OUT3 – CON5	R14	Resistance with thermostat on the cylinder
PRES1	DS15	Pressure sensor
OUT1 – CON4	6	Vacuum pump
OUT13B – CON7	7-8	Compressor – Motor fan
SW1 – CON11	DS16	Separator float
SW2 – CON17	DS17	Security pressure switch
LS14	-	Buzzer
LCD - CN1	-	LCD connector
USB	-	USB port cable connector
KEYBOARD	-	Dashboard
PRINTER	-	Printer (optional)



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CF e P.I. IVA 00697030344 - Capitale Sociale €. 900.000 i.v. - R.E.A. PR 158235 - Reg. Trib. PR 15420 - N. Meccanogr. PR 000648
Modulo del Sistema Qualità Rev. 1

SINCERT

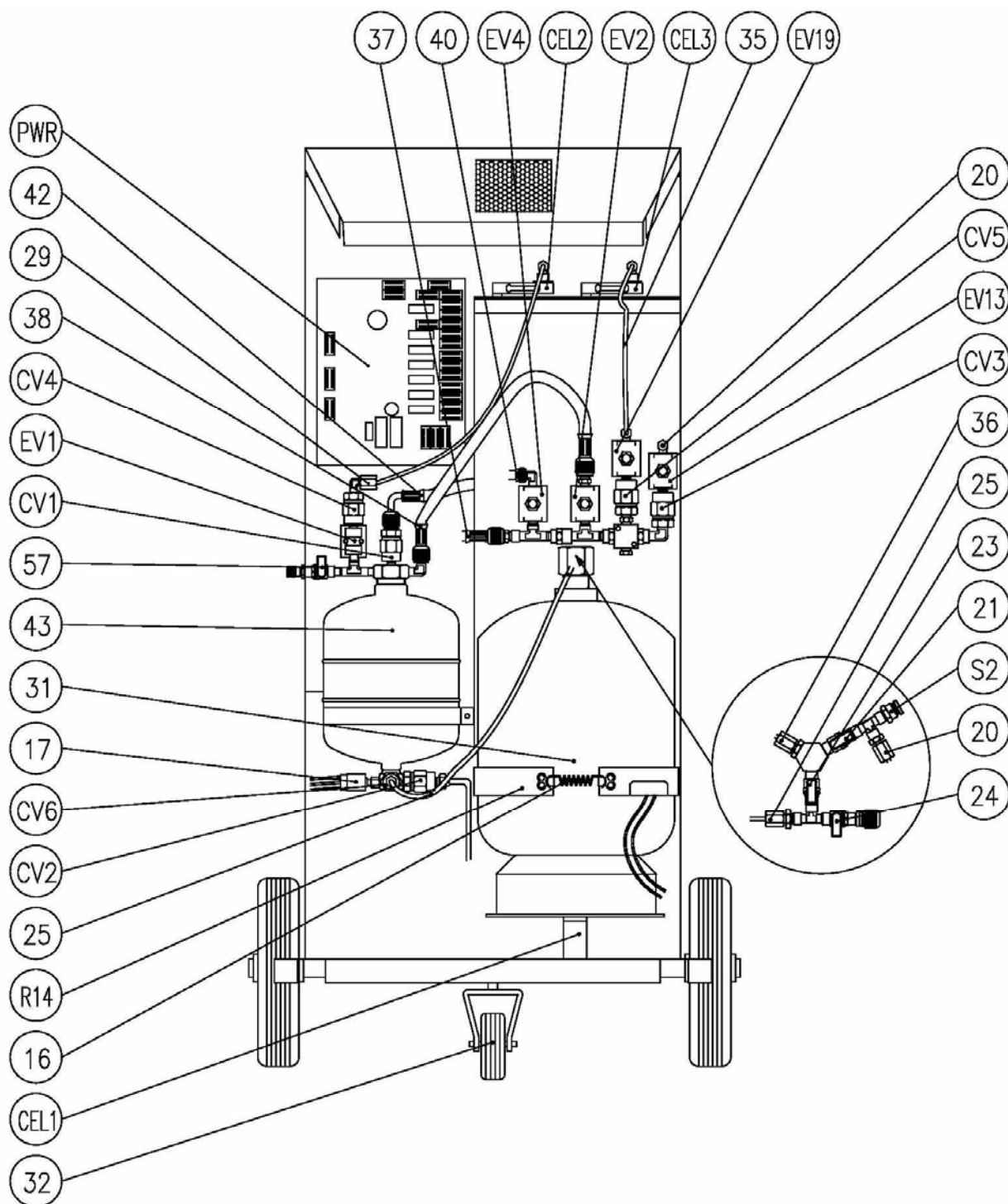
ISO 9001

BUREAU VERITAS
Certification



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18. AC930 STATION LAYOUT.



Rel 3.0

18

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Quality System module Rev. 1



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Modulo del Sistema Qualità Rev. 1

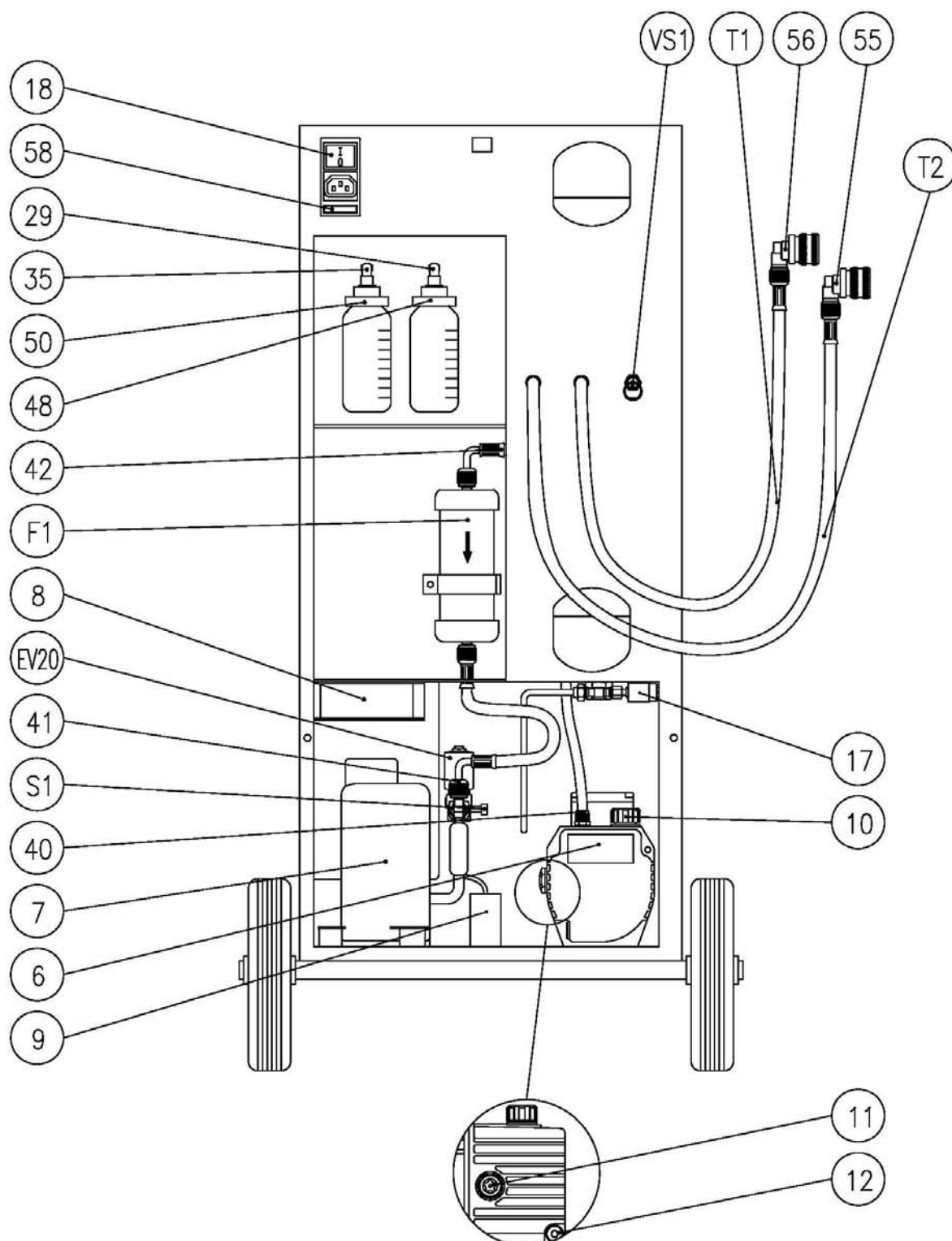
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Modulo del Sistema Qualità Rev. 1

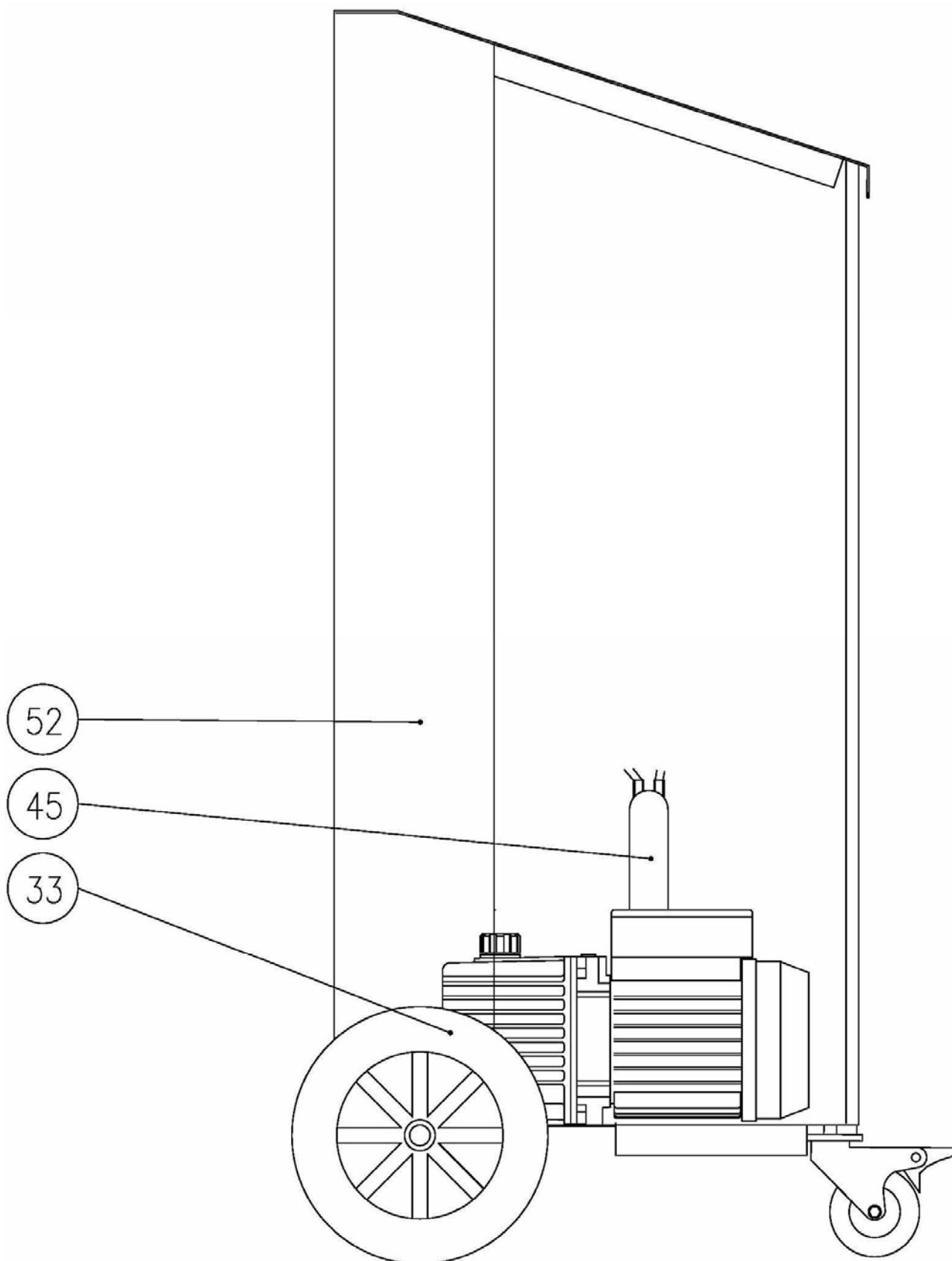
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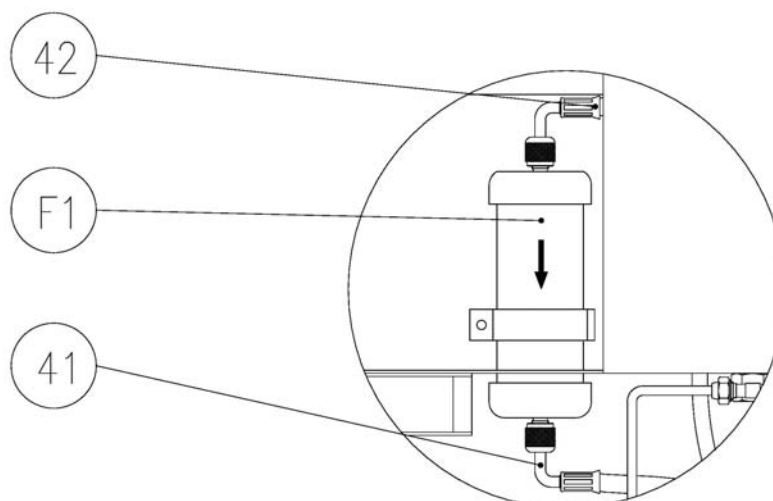
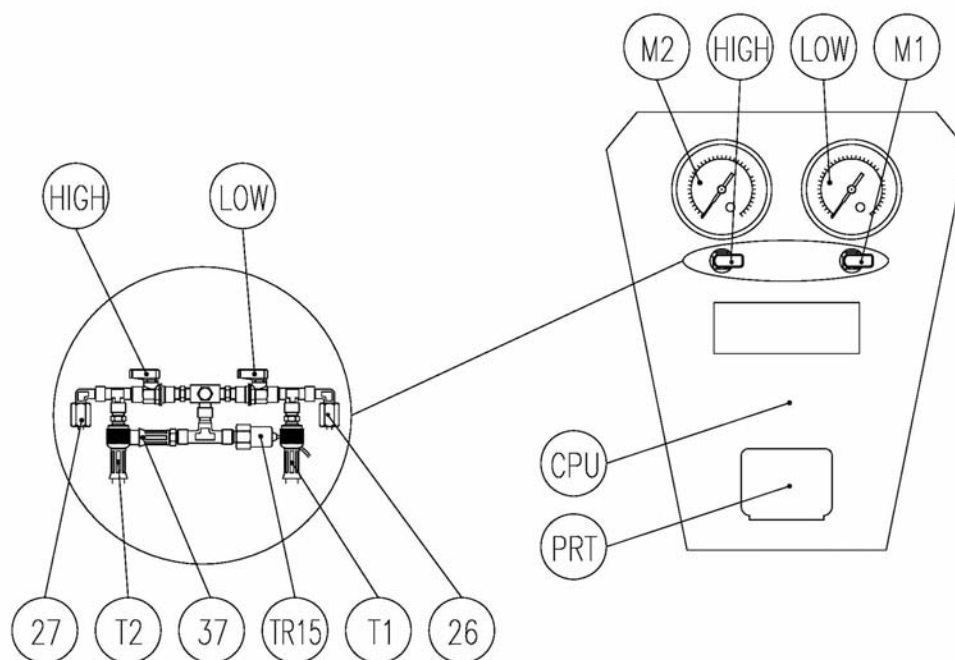
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19. SPARE PARTS LIST.

Description	Code	Position
LOW PRESSURE MANOMETER	1640003	M1
HIGH PRESSURE MANOMETER	1640004	M2
SOLENOID VALVE (14016015) – 10 Bars	1210007	EV1, EV2, EV4, EV13, EV19
SOLENOID VALVE (14016016) – 20 Bars	1210008	EV20
CHECK VALVE (14017005)	1570025	CV1...CV6
LOAD CELL 100 kg (14025059)	1590017	CEL1
LOAD CELL 5 kg (14015013)	1590018	CEL2 – CEL3
DRIER FILTER (14015013)	1990158	F1
COMPRESSOR (14002027)	1990159	7
3M HIGH PRESSURE HOSE (06071072002)	1700043	T2
3M LOW PRESSURE HOSE (06071073001)	1700044	T1
HIGH PRESSURE QUICK COUPLING	1472209	55
LOW PRESSURE QUICK COUPLING	1472210	56
GUARD 58X81X49 (14012040)	1990160	-
AC930 BOARD	1800169	PWR
PRESSURE SENSOR	1610016	TR15
FREON CYLINDER JOINT KIT	1800166	-
¼ SAE FREON CYLINDER RED.	1990162	-
¼ SAE HIGH PRESSURE QUICK COUPLING	1470050	-
VACUUM PUMP	1330034	6
PANEL PRINTER MINIPLUS	1450051	PRT
REAR WHEEL (diameter 200 mm)	1580008	-
CYLINDER EMPTYING KIT	1800176	-
WEIGHT SAMPLE for CALIBRATION	1800175	-
2 OIL CANS KIT	6019000301	48 - 50



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20. TROUBLESHOOTING.

- a. The Station does not turn on.
 - Check the fuse placed under the on/off switch.
- b. The Station does not finish the recharge.
 - Check that the cocks are open and that there are no obstructions into the hoses.
 - Check for the correct position of the cocks on the Refrigerant Cylinder.
 - Check that the resistor of the Refrigerant Cylinder is hot during the recharge phase.
 - Check that the vacuum cycle is completely carried out and that there are no leaks on the vehicle. The vehicle circuit must be at -1Bar at the end of the vacuum cycle.
- c. The Station does not perform the Recovery.
 - Check that the cocks are open and that there are no obstructions into the hoses.
 - Check the Compressor operation.
 - Check the correct Pressure Sensor calibration.
- d. The Station does not perform the Recovery cycle.
 - Check the correct Vacuum Pump operation.
 - Check the correct Pressure Sensor calibration.
- e. The Station does not introduce the new oil quantity into the vehicle correctly.
 - Check that the Bottle air hose is not jammed.
 - Check the New Oil Scale correct calibration (in this case, check the Exhausted Oil Scale too).
- f. The Station stops during the Recovery phase: Pressure too high.
 - Check the correct Over Pressure Sensor operation.
 - Replace the Microprocessor Board.
- g. The Station update through the USB port does not end correctly.
 - Check that the USB support connected to the port is FAT32-formatted and that there is the installation file only.
 - Replace the Microprocessor Board.
- h. The Station does not print with Printer.
 - Check the Parameters.
 - Check the printer cable correct connection.
 - Replace the Printer.
- i. The Station display does not visualise correctly the software pages.
 - Check that the Display flat cable does not have interferences touching the solenoid valves cables. Try to move the flat cable into a different position and check if the problem occurs again.
- j. The Station displays the "refrigerant missing" message.
 - Fill in the refrigerant cylinder with a 2000gr-minimum quantity of refrigerant (the recommended quantity is of 3000gr).